

Thomas says Phase 1 lessons broad, valuable

By John Ira Petty

Mir was never too cold, never too humid and was too hot only for about a day, Andy Thomas said of his 141 days aboard the Russian space station. But he'd like to see some brighter colors inside the International Space Station.

That is only one of a myriad of lessons, personal and programmatic, Thomas brought back to Earth at the end of Phase 1. Not the least of the benefits was the cooperation established between Russia and the United States in space exploration.

His mission, he said, also represented "truly a deep personal accomplishment for me." He said it was "perhaps the hardest thing I've ever attempted in my personal career. It takes a lot of determination and a lot of soul-searching to complete a mission like that. The personal reward for me was that I was able to do that, complete the mission, and that I can come and talk to you today."

About Russian Space Agency-NASA cooperation, he said: "It's ironic to think that 40 years ago, the space program got its start born out of competition with the eastern block countries. Now, 40 years later, we've advanced to the point where in stead we have a program of cooperation born from that original competition."

It's important, he said, to judge the cooperative program objectively, on its own merits unclouded by cold war prejudices.

"I think we can do that — when we look at this program that we've established with the Russian space agency; you can see that it is indeed the right thing to do. It has set us on a direction of cooperation with the Russians which will lead us to the International Space Station.

"I think history will record the great success of really bringing the two agencies together and starting a spirit of cooperation to explore space."

Thomas told the July 8 press conference that physically he was feeling good. "One of the interesting things about a flight like this is the reacclimatization process." Space is an unnatural environment, but the absence of gravity becomes the norm. "When you come back, what was originally the natural environment feels very unnatural."

Thomas said that while the initial sensations of ordinary acts like standing are very strange. Just after landing, "I felt remarkably good." A few hours later there was a delayed response, with balance problems and nausea for about 12 hours.

The first week involved a lot of aches and pains, as muscles learned to work again in Earth's gravity. "I'd get up in the morning and I'd feel like I'd run a marathon without training for it." He said his neck and shoulders were still sore; and that the soles of his feet were

tender, making it difficult to stand in one place for a long time.

Views of the Earth were a highlight of the flight, Thomas said. He recalled a spectacular night view of the aurora australis, a green curtain moving across the sky for hundreds of miles. Another extreme were the extensive fires Central America, disturbing with their huge pall of smoke.

Day-to-day interactions with Russian crew members went well. Two Mir crews were aboard when Thomas arrived—he brought the total to six people. When the Mir 24 crew left, things became less congested and rapport started to build.

He said he never felt any sense of claustrophobia, although there was a sense of confinement—there weren't many places to go.

"I think probably about a month into the flight you start to develop a daily routine you live and work by. You need to do that, but the downside is that you start to notice ... the options available to you are very limited." Still, once developed, the routine makes the crew member more productive and time passes more quickly.

Practical lessons were learned from Phase 1, Thomas said. "We've learned the mechanics of how you operate a space station. We've also learned—and it shouldn't be underesti-

mated—how to work with the Russians."

There were personal lessons too, about how to live and work for a long time in space, things like the best way to package food to minimize waste, what to wear, what kind of exercise to do, how a space station should be laid out and even what color should the interior be painted.

James Van Laak, deputy manager of the Phase 1 Program, noted that Phase 1 turned intellectual concepts into practical applications. One lesson was how to support long-duration crew members.

"We made some serious mistakes in the beginning. We've learned from that," Van Laak said. "I hope that Andy felt ... we did the best we could to support him."

Thomas said he had experienced a "great level" of support.

Maintenance was another lesson, Van Laak said. The shuttle gets about a million hands-on hours of work before each flight of a few days. When things break on ISS during its 15 years in orbit, the crew will have to fix them. Maintenance was a major part of Mir crew activity, he noted.

Phase 1 was a contract with the Russians, while subsequent phases will be a cooperative relationship. Phase 1 was worth the money. "Basically we're happy with the deliverables," Van Laak said. And, more immediately "We appreciate the fine work that Andy did."



Fifteen JSC workers earn Silver Snoopy

Fifteen JSC workers are now the proud owners of Silver Snoopy Awards presented by astronauts.

The awards, administered by the Space Flight Awareness Program, are the astronauts' personal recognition of individual excellence contributing to human space flight missions.

Civil service employees receiving the awards were Margie Keller, Flight Crew Operations Directorate; Debbie Denton-Misfeldt, Human Resources Office; Nathan Moore, Space and Life Sciences Directorate; Joseph Aquino, Susan Beisert, Matthew Bordelon, Peter Cerna, David Graham and Kimberly Kirby, Mission Operations Directorate.

Contractor employees receiving the awards are Paul Diggins and Charles Rittrivi, Boeing Space Operations; Debe Armstrong, Defense Contracts Management Command-Sacramento; Ronald Smith, Dynacs Engineering Co.; Barbara Corn, ISS Advisory Committee, and Linda Doran Science Applications International Corp.

Silver Snoopy Awards, received by less than 1 percent of NASA and contractor workers, are much coveted. Additional astronaut presentations of Silver Snoopy Awards are planned later this year.



BELAYING BROWN—STS-95 Commander Curt Brown mission simulates an emergency egress procedure in the JSC's systems integration facility, as crew trainer Sharon Jones spots for him. STS-95, tentatively set to launch Oct. 29, will involve a variety of science experiments carried in the pressurized Spacehab module, deployment and retrieval of the Spartan free-flyer payload, and operations with the HST Orbiting Systems Test and the International Extreme Ultraviolet Hitchhiker.

NASA Photo S98-07972

Hubble reveals Neptune moon, Titan, warmer

Observations by NASA's Hubble Space Telescope and ground-based instruments reveal that Neptune's largest moon, Triton, seems to have heated up significantly since the Voyager spacecraft visited it in 1989.

"Since 1989, at least, Triton has been undergoing a period of global warming—percentage-wise, it's a very large increase," said James Elliot, an astronomer at the Massachusetts Institute of Technology. The warming trend is causing part of Triton's frozen nitrogen surface to turn into gas, thus making its thin atmosphere denser. Elliot and his colleagues from MIT, Lowell Observatory, and Williams College published their findings in the June 25 issue of the journal Nature.

Even with the warming, no one is likely to plan a summer vacation on Triton, which is a bit smaller than Earth's moon. The 5 percent increase means that Triton's temperature has risen from about 37 degrees on the absolute (Kelvin) temperature scale (-392 degrees Fahrenheit) to about 39 degrees Kelvin (-389 degrees Fahrenheit). If Earth experienced a similar change in global temperature over a comparable period, it could lead to significant climatic changes.

Triton, however, is a very different and simpler world than Earth, with a much thinner atmosphere, no oceans and a surface of frozen nitrogen. But the two share some contributing factors to global warming, such as changes to the Sun's heat output, how much sunlight is absorbed and reflected by their surfaces, and the amount of methane and carbon monoxide (greenhouse gases) in the atmosphere.

By studying these changes on Triton, the scientists hope to gain new insight into Earth's more complicated environment.

Mars water, rock findings offer surprising scientific conclusions

A year after the landing of Mars Pathfinder, mission scientists say that data from the spacecraft paint two strikingly different pictures of the role of water on the red planet, and yield surprising conclusions about the composition of rocks at the landing site.

"Many of the things that we said last summer during the excitement after the landing have held up well," said Dr. Matthew Golombek, Pathfinder project scientist at NASA's Jet Propulsion Laboratory, Pasadena, Calif. "But we have now had more time to study the data and are coming up with some new conclusions."

Similar to ongoing science results from NASA's Mars Global Surveyor spacecraft currently in orbit around Mars, Pathfinder data suggest that the planet may have been awash in water 3 billion to 4.5 billion years ago. The immediate vicinity of the Pathfinder land-

ing site, however, appears to have been dry and unchanged for the past 2 billion years.

Several clues from Pathfinder data point to a wet and warm early history on Mars, according to Golombek. Magnetized dust particles and the possible presence of rocks that are conglomerates of smaller rocks, pebbles and soil suggest copious water in the distant past. In addition, the bulk of the landing site appears to have been deposited by large volumes of water, and the hills on the horizon known as Twin Peaks appear to be streamlined islands shaped by water.

But Pathfinder images also suggest that the landing site is essentially unchanged since catastrophic flooding sent rocks tumbling across the plain 2 billion years ago. "Since then this locale has been dry and static," he said.

While the area appears to have been untouched by water for eons,

wind appears to have been steadily eroding rocks at the landing site. Analysis of Pathfinder images shows that about one to two inches (three to five centimeters) of material has been stripped away from the surface by wind, Golombek noted.

Chemical analysis of a number of rocks by the alpha proton X-ray spectrometer instrument on Pathfinder's mobile Sojourner rover, meanwhile, reveals an unexpected composition that scientists are still trying to explain.

The current assessment of data from this instrument suggests that all of the rocks studied by the rover resemble a type of volcanic rock with a high silicon content known on Earth as andesite, covered with a fine layer of dust. All of the rocks appear to be chemically far different from meteorites discovered on Earth that are believed to have come from Mars.

"The APXS tells us that all of



NASA Photo PIA01121

This image of Pathfinder Lander on Mars was taken from the Sojourner Rover. The lander's IMP, on the lattice mast, is looking back at the rover.

these rocks are the same thing with different amounts of dust on them," said Golombek. "But images suggest that there are different types of rocks. We don't yet know how to reconcile this."

In other recent Pathfinder science findings, Dr. Steven Metzger of the University of Nevada found direct evidence of gusting winds called

"dust devils" in images from Pathfinder's lander. Such dust devils had been seen in some Viking orbiter images and inferred from measurements of atmospheric pressure and winds by other instruments on the Pathfinder lander, but were not spotted in actual surface images until Metzger's discovery.